

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

New claim 30 has been added.

Applicant respectfully submits that the amendments to the claims are supported by the disclosure of Applicant's application. For example, at least page 3, lines 28-36, and page 5, lines 1-29, of Applicant's specification provide support for the amendments to the claims.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-7 and 9-30 are now pending in this application.

Rejection under 35 U.S.C. § 102

Claims 1, 2, 4, 5, 6, 9, 10, 16-18, 22, 24-26, and 28 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,844,777 to Werner (hereafter "Werner"). This rejection is respectfully traversed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See generally M.P.E.P. § 2131.

Werner discloses fluxless brazing of aluminum in which the surface of an aluminum or aluminum alloy part is first pretreated by a chemical cleaning action to provide a "workably thin" oxide film. See Werner at col. 1, lines 8-52; col. 2, lines 18-30. Werner teaches that a practical, successful fluxless brazing can be performed if surfaces are pretreated by the chemical cleaning action to provide the "workably thin" oxide film to allow desirable wetting and flowing to produce a brazed joint. See Werner at col. 2, lines 18-34. Werner discloses that the oxide film is treated so that it is sufficiently thin to be penetrated by a fluxless filler alloy. See Werner at col. 2, lines 30-34.

The Office argues on pages 2-3 of the Office Action that Werner would inherently have an oxide with a thickness greater than 25 nm. The Office argues that “An Investigation of the Native Oxide of Aluminum Alloy 7475-T7651 Using XPS, AES, TEM, EELS, GDOES and RBS” by Toh *et al.* (hereafter “Toh”) demonstrates that the aluminum alloy of Werner would have a native oxide thickness greater than 25 nm. Applicant respectfully disagrees.

Toh studied the native oxide of hot rolled Al alloy 7475-T7651, not the native oxide of an aluminum alloy under ambient conditions. See Toh at page 370, under “4. Discussion and Conclusions.” One of ordinary skill in the art would understand that hot rolled aluminum would have a thick scale of oxide due to the highly oxidizing conditions of high temperature in an environment of air that the aluminum would experience during a hot rolling process.

Such hot rolling conditions are not ambient conditions that normally produce a relatively thin layer of oxide the surface of aluminum and aluminum alloys. Native oxides produced by ambient conditions are discussed in Applicant’s specification at page 3, lines 28-36:

The native oxide and/or hydroxide layer, which is formed on all the surfaces of workpieces made from aluminum or aluminum compounds that are exposed to ambient air, usually has a thickness of less than 10 nm and may be up to 20 nm thick in the case of humid air. On account of this low thickness, the oxide and/or hydroxide layer has a flexibility, so that the thermal stresses within the oxide and/or hydroxide layer can be dissipated.

The thick scale produced by the highly oxidizing conditions of hot rolling would not be such a native oxide formed by conditions in ambient air.

Furthermore, the Office argues on page 2 of the Office Action that aluminum alloy 7475 of Toh would be sufficiently similar to the alloys of Werner, including alloys 6061 and 2219 in the Table of Werner, because these alloys share magnesium and zinc as common alloying elements. However, the Office does not properly consider the effects of additional elements not shared by these alloys or different amounts of alloying elements, which can also affect the oxidation properties of these alloys.

Therefore, the teachings of Toh do not apply to the aluminum alloy of Werner, which is not provided as a brazing material in the form of hot rolled aluminum, and do not serve as

evidence that the aluminum alloy of Werner would have an oxide thickness greater than 25 nm.

Werner does not disclose a soldering workpiece comprising, among other things, an oxide and/or hydroxide layer with a thickness d that is greater than a native thickness of the oxide and/or hydroxide layer formed in ambient air, as recited in claim 1. Instead, the aluminum alloy of Werner would appear to merely have a native oxide layer that is formed in ambient air. Furthermore, Werner specifically teaches chemically cleaning the aluminum alloy to make the oxide workably thin, which reduces, not increases, the thickness of the oxide layer. Therefore, Werner does not disclose the soldering workpiece of claim 1. Claims 2, 4, 5, 6, 9, 10, and 16-18 depend from claim 1.

Nor does Werner disclose a soldering process in which, among other things, a soldering workpiece made from aluminum and/or aluminum compounds is provided, wherein the soldering workpiece has an oxide and/or hydroxide layer arranged at a surface of the soldering workpiece, wherein a thickness d of the oxide and/or hydroxide layer is up to 20 nm, and the thickness d of the oxide and/or hydroxide layer is increased to a thickness sufficient to provide contact between a soldering compound and the soldering workpiece underneath the oxide and/or hydroxide layer during a subsequent soldering process, as recited in claim 22. Instead, Werner simply provides an aluminum alloy with a native oxide apparently formed in ambient air. In addition, Werner teaches chemically cleaning the aluminum alloy to make the oxide workably thin, which further reduces the thickness of the oxide. Thus, Werner does not anticipate claim 22. Claims 23-25 and 28 depend from claim 22.

Nor does Werner disclose a soldering workpiece comprising, among other things, an oxide and/or hydroxide layer that is greater than a native thickness of the oxide and/or hydroxide layer, wherein the thickness of the oxide and/or hydroxide layer is greater than 25 nm, as recited in claim 26. Instead, Werner simply provides an aluminum alloy with a native oxide apparently formed in ambient air. Furthermore, Werner teaches chemically cleaning the aluminum alloy to make the oxide workably thin.

For at least the reasons discussed above, Werner does not anticipate claims 1, 2, 4, 5, 6, 9, 10, 16-18, 22, 24-26, and 28 because Werner does not disclose all of the features of

claims 1, 22, and 26. Reconsideration and withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

Claim 3

Claim 3 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Werner as applied to claim 1, and further in view of U.S. Patent No. 3,986,897 to McMillan *et al.* (hereafter “McMillan”). This rejection is respectfully traversed. McMillan fails to remedy the deficiencies of Werner discussed above in regard to independent claim 1, from which claim 3 depends.

Claims 7, 11-13, 15, and 20

Claims 7, 11-13, 15, and 20 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Werner as applied to claim 1, and further in view of U.S. Patent No. 3,747,199 to Swaney, Jr. (hereafter “Swaney”). This rejection is respectfully traversed. Swaney fails to remedy the deficiencies of Werner discussed above in regard to independent claim 1, from which claims 7, 11-13, 15, and 20 depend. Furthermore, Swaney regards a brazing process, which involves different considerations than a soldering process, such as higher processing temperatures relative to soldering. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 14 and 21

Claims 14 and 21 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Werner as applied to claim 10, and further in view of U.S. Patent No. 5,618,357 to Knepper *et al.* (hereafter “Knepper”). This rejection is respectfully traversed. Knepper fails to remedy the deficiencies of Werner discussed above in regard to independent claim 1, from which claims 14 and 21 depend. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 23, 27, and 29

Claims 23, 27, and 29 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Werner as applied to claim 22, and further in view of U.S. Patent No. 3,666,869 to Orecchia (hereafter “Orecchia”). This rejection is respectfully traversed.

The Office suggests on pages 12-13 of the Office Action that it would have been obvious to modify the process of Werner by the teachings of Orecchia to provide an oxide film with thickness of up to four tenths of a millimeter.

Applicant respectfully disagrees because Werner teaches against such a modification. Applicant notes that the prior art must be considered in its entirety, i.e., as a whole, including disclosures that teach away from the claims, and that references cannot be combined where references teach away from their combination. See MPEP § 2141.02, Part VI; 2145, Part X(D)(2).

As discussed above, Werner teaches that a practical, successful fluxless brazing can be performed if surfaces are pretreated by the chemical cleaning action to provide the “workably thin” oxide film to allow desirable wetting and flowing to produce a brazed joint. See Werner at col. 2, lines 18-34. Werner discloses that the oxide film is treated so that it is sufficiently thin to be penetrated by a fluxless filler alloy. See Werner at col. 2, lines 30-34. Thus, Werner teaches against any modification to increase the thickness of the an oxide film because Werner teaches the desirability and need to keep the oxide film “workably thin” for a successful fluxless brazing process.

Furthermore, the modification argued by the obvious would not have been obvious to one of ordinary skill in the art because such a modification would destroy the principle of operation of the product of Werner because it would provide thicker oxides, not “workably thin” oxide films. See MPEP § 2143.01, Part VI.

For at least the reasons discussed above, it would not have been obvious to modify the process of Werner by the teachings of Orecchia, as suggested by the Office. Reconsideration and withdrawal of this rejection is respectfully requested.

New Claim

New claim 30 has been added. Claim 30 depends from claim 22 and is allowable for at least the reasons discussed above and for its respective additional recitations.

CONCLUSION

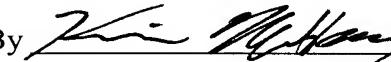
Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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